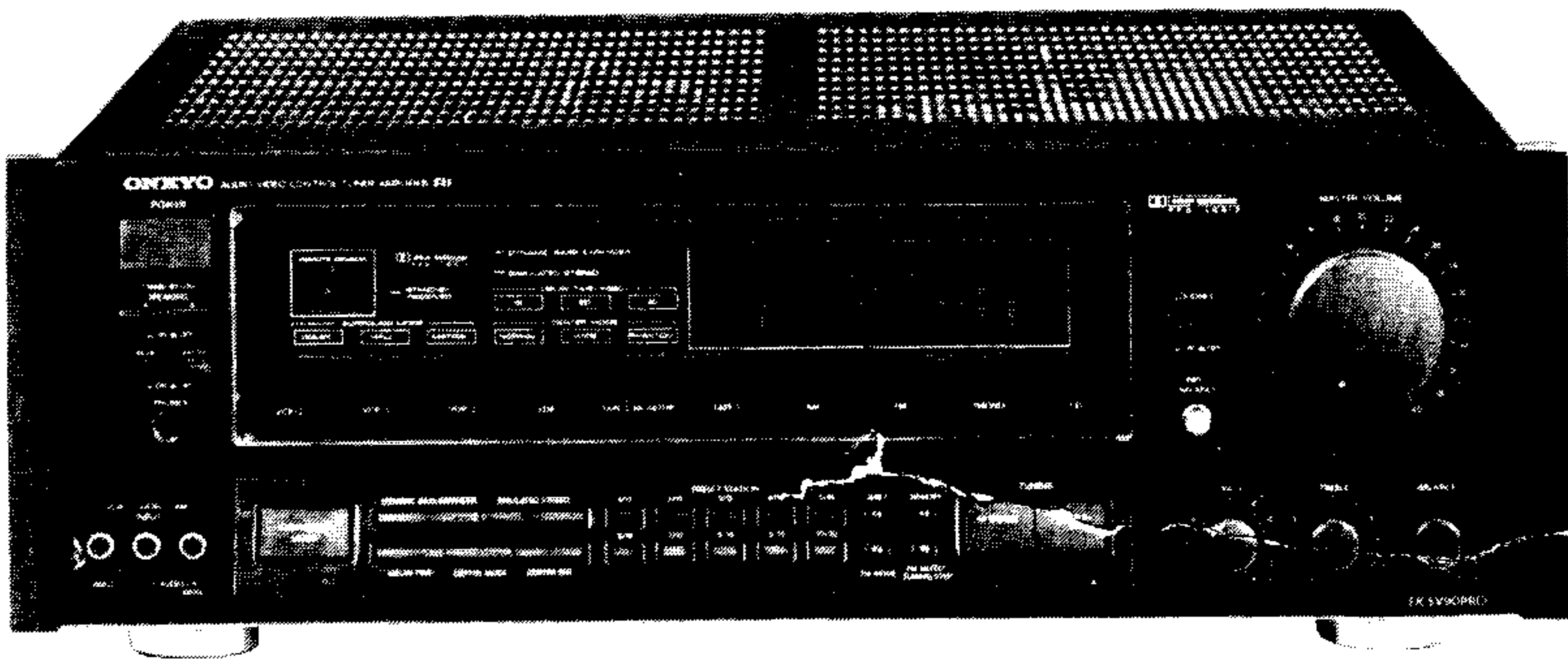


ONKYO SERVICE MANUAL

AUDIO VIDEO CONTROL TUNER AMPLIFIER MODEL TX-SV90PRO



BHUD, BHUDN	120V AC, 60Hz
BHUQ	240V AC, 50Hz
BHUW	120/220V AC, 50/60Hz

SAFETY-RELATED COMPONENT WARNING!!
COMPONENTS IDENTIFIED BY MARK  ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.
MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

ONKYO
AUDIO COMPONENTS

SV90 PRO

A/V tuner amplifier
abundance of
distortion power
by* Pro-Logic
ound System for
realism and

Top Performance

is built around Onkyo's distortion amplifier circuitry to sound quality offered by music sources. Luscious, und sound performance is al of five high quality s for driving the front (left and center speakers. In a 5-channel stereo configura- PRO pumps out a big nel, both channels driven 20 Hz to 20,000 Hz with 0.04% total harmonic distortion. The rear channel amps are each 30 W (0.08% THD).

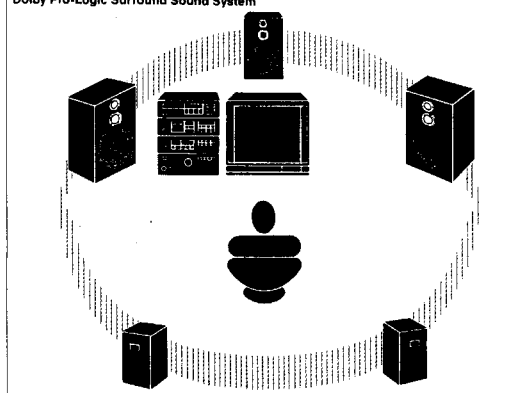
Dolby® Pro-Logic Surround Sound System

Dolby Pro-Logic Surround Sound employs circuitry based on that found in the professional Dolby surround decoders used in movie theaters. This "active decoder" configuration is more sophisticated than the "passive decoder" circuitry found in conventional receivers. Dolby Pro-Logic Surround's biggest feature is its "directional emphasis circuit." It adds a new, independently controlled "center channel" to the existing stereo L/R front channels and monaural L/R rear channel. The result is the same sonic composition you hear in a theater. Rather than just a combination of

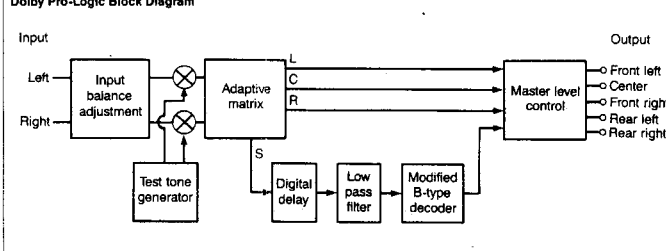
left and right channel information, the center channel benefits from logic steering circuitry that increases separation from around 3 dB to between 26 and 40 dB. This results in pinpoint directionality, image stability and enhanced overall sound quality. For example, the voices of on-screen characters always seem to come directly from the TV and never from a side speaker, even if you are sitting far to one side of the TV screen. A built-in noise sequencer generates test tones, making it easy to set the optimum channel balance. Simply listen to the test tone as it sequences automatically between the left, center, right and rear channels and

set the channel levels so that they match. It's that easy to bring a theater ambience into your home.

Dolby Pro-Logic Surround Sound System



Dolby Pro-Logic Block Diagram



Adjustable Digital Time Delay

The TX-SV90 PRO includes adjustable digital time delay for the rear speaker channels to let you acoustically tailor the perceived room size to match the characteristics of the program material. This feature works with both the Dolby Pro-Logic and Hall surround modes and can be adjusted either manually or via the remote control. Delay can be set to 15, 20 or 30 milliseconds. The longer the delay, the larger the apparent acoustical size of the listening room.

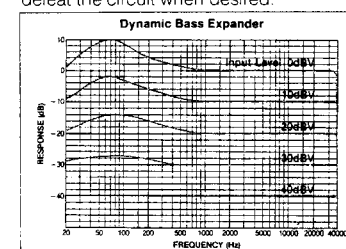
Discrete Pre-Out and Main-In Terminals

If you own a separate preamp or power amp, you'll appreciate the TX-SV90 PRO's pre-out and main-in terminals. The pre-out terminals for the front, rear and center channels allow you to route these signals directly to a separate power amp, bypassing the power amp blocks completely. You can

also connect the TX-SV90 PRO to a separate preamp using the main-in facilities for the front left and front right channels only.

Dynamic Bass Expander*

This exclusive Onkyo feature helps you get the most out of any sound source, especially your VCR or videodisc player. It expands low frequency response depending on the input signal level. The effect is totally new because the rate of expansion changes constantly, unlike conventional bass boost circuits. Deep bass impact and definition increase without altering the upper midbass and midrange. You can defeat the circuit when desired.



98-Function Programmable Universal Remote Control Included

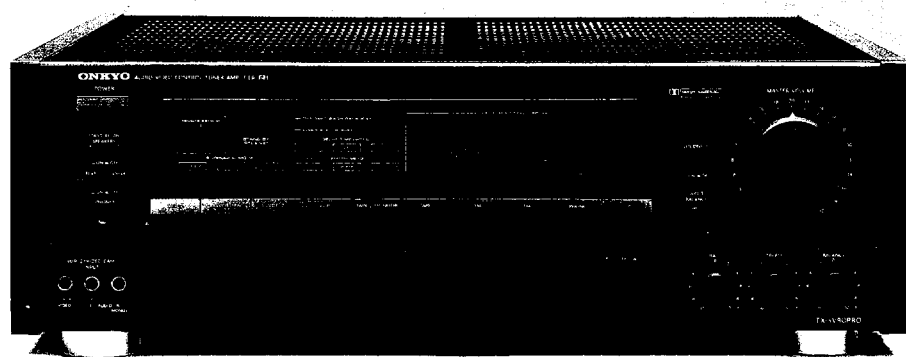
With the RC-AV90M you can control all the components in your A/V system. This not only includes infrared remote compatible Onkyo components, but virtually any component or appliance made by any manufacturer that accepts infrared codes. All RI commands for RI system remote compatible Onkyo components are preprogrammed. They can also be replaced with other control codes. And a total of 98 separate control codes can be programmed. So you'll have complete command over your A/V system no matter how many separate components there are.

*There may be some cases of incompatibility due to nonstandard systems used by some manufacturers.

Features at a Glance

Amplifier Section

- 110 Watts Per Channel (Front: 100 Watts Per Channel, Center: 30 Watts Per Channel, Surround Sound)
 - Discrete Output Stages for Front, Center, and Surround Channels and Center Channel
 - Dolby® Pro-Logic Surround Sound System
 - Adjustable Digital Time Delay (15, 20, 30 Milliseconds)
 - Three Surround Sound Modes (Pro-Logic, Hall Surround, Digital Time Delay, and Mono)
 - Dynamic Bass Expander (Bass Impact and Extension)
 - Simulated Stereo for Video TV Soundtracks
 - Front Panel VDP-2/Camcorder Copying Capability
 - VCR-2 Mono/Stereo Selection
 - Pre-Out Terminals for Rear Channels; Pre-Out and Main-In Terminals for Front Channels
 - Left + Right Output Terminals for Woofer
 - Tape-1 to Tape-2 Copying Capability
 - Motor-Driven Five-Gang Tuner Control, Discrete Center Channel Controls
 - Separate A, B, Rear and System Selectors
 - Heavy-Duty Four-Way Speaker Front Outputs
 - Audio Muting (-20dB) (Remote Control)
 - Loudness Control
 - Headphone Jack
- ### Tuner Section
- Random Preset Tuning with Memory
 - Battery Free Backup to Memory Contents
 - Automatic Tuning Mode (Video Compatible) and Memory
 - Fluorescent Station Indicator
 - Cable FM Compatibility (Two Steps)
- ### General
- Inputs for Four Video Sources (Video Compatible) and Flip Down Auxiliary Control
 - Woodgrain Side Panels



SPECIFICATIONS

AMPLIFIER SECTION

Power Output: Stereo mode
110 watts per channel min. RMS. at 8 ohms, both channels driven, from 20Hz to 20,000Hz, with no more than 0.04% total harmonic distortion.

Surround mode
100 watts per channel min. RMS. at 8 ohms both channels driven, from 20Hz to 20,000Hz, with no more than 0.04% total harmonic distortion. (FRONT)
30 watts per channel min. RMS. at 8 ohms 1,000Hz with no more than 0.08% total harmonic distortion. (REAR/CENTER Matrix surround mode)

Total Harmonic Distortion: 0.04% at rated power (FRONT)
THD Distortion: 0.04% at rated power (FRONT)
Gain Factor: 70 at 8 ohms (FRONT)
Input Impedance: Phono: 2.5mV/50 kohms
CD/Tape Play: 150mV/50 kohms
Tape Rec: 150mV/2.2 kohms (Phono)
Main input (FRONT): 1V, 50 kohms
Pre out (FRONT): 1V, 2.2 kohms
Pre out (REAR/CENTER): 1V, 2.2 kohms
mono out (SUB WOOFER): 1V, 2.2 kohms

Phono Overload: 120mV RMS. at 1,000 Hz, 0.5 % THD.

Frequency Response: 20 to 30,000 Hz, +/-1 dB
VDP IN → DOLBY SURROUND
REAR PRE OUT : 30 to 7 kHz, +0 dB, -3 dB

RiAA Deviation: 20 to 20,000 Hz, +/-0.8 dB

Tone Control: BASS: +/-10 dB at 100 Hz
TREBLE: +/-10 dB at 10,000 Hz

Signal to Noise Ratio: PHONO MM: 77 dB (IHF A, 5mV input)
CD/TAPE: 93 dB (IHF A)

Muting: -20dB

VIDEO SECTION

signal sensitivity and Impedance
VDP/VCR normal input, output: 1 V_{p-p}, 75 ohms
S-VIDEO input, output: Y signal 1 V_{p-p}, 75 ohms
C signal 0.28 V_{p-p}, 75 ohms

TUNER SECTION

FM:
Tuning Range: 87.50 – 108.00 MHz (50/25 kHz steps)
Usable Sensitivity: Mono: 11.2 dBf, 1.0 μV (75 ohms)
Stereo: 17.2 dBf, 2.0 μV (75 ohms)
50dB Quieting Sensitivity: Mono: 17.2 dBf, 2.0 μV (75 ohms)
Stereo: 37.2 dBf, 20 μV (75 ohms)
Capture Ratio: 1.5 dB
Image Rejection Ratio: 40 dB
IF Rejection Ratio: 90 dB
Signal-to-Noise Ratio: Mono: 76 dB
Stereo: 70 dB
Alternate Channel Attenuation: 65 dB
AM Suppression Ratio: 50 dB
Harmonic Distortion: Mono: 0.1%
Stereo: 0.2%
Frequency Response: 30 – 15,000 Hz ±1.0 dB
Stereo Separation: 45 dB at 1kHz
30 dB at 100 – 10,000Hz
Muting Level: 17.2 dBf

AM:
Tuning Range: 530 – 1710 kHz (10 kHz steps) and /or
531 to 1,602 kHz (9kHz steps) (worldwide model)
522 to 1611 kHz (9 kHz steps) (Australian model)
Usable Sensitivity: 30 μV
Image Rejection Ratio: 40 dB
IF Rejection Ratio: 40 dB
Signal-to-Noise Ratio: 40 dB
Harmonic Distortion: 0.7%

GENERAL

Power Supply:
USA model: AC120V, 60Hz
Australian model: AC240V, 50Hz
Worldwide model: 120 and 220V Switchable, 50/60Hz
Dimensions (W x H x D): 465 x 158 x 432 mm
18-5/16" x 6-1/4" x 17"
Weight: 14.8kg., 32.3 lbs.

REMOTE CONTROL TRANSMITTER RC-AV90M

Transmitter: Infrared
Signal Range: Approx. 5 meters (16ft. 4")
Power Supply: Four "AAA" batteries (1.5V x 4)
Dimensions (W x H x D): 70 x 30 x 19
2-3/4" x 1-3/16" x 7-1/2"
Weight: 200 grams 7.1 oz.
(including batteries)

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

D (120V) model

Circuit No.	Part No.	Description
F901	252053	8A (ST-6), Primary
F903, F904	252053	8A (ST-6), Secondary

Q (240V) model

Circuit No.	Part No.	Description
F902	252077	4A-SE-EAK, Primary
F903, F904	252079	6.3A-SE-EAK, Secondary

W (Worldwide) model

Circuit No.	Part No.	Description
F901	252053	8A (ST-6), Primary
F902	252077	4A-SE-EAK, Primary
F903, F904	252079	6.3A-SE-EAK, Secondary

2. Change of AM band selector

With the exception of the worldwide model, a AM BAND step selector switch is not provided.

Band step	D714
10kHz→ 9kHz	Additional
9kHz→ 10kHz	Eliminated

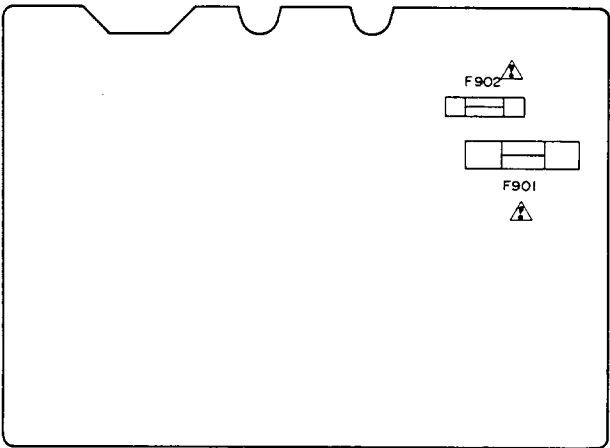
– Worldwide model –

Woldwide models are equipped with a band step selector switch. This switch is located on the back panel. This switch is set to 9kHz at the factory, but may have to be reset to 10kHz depending on the area where the unit is used.

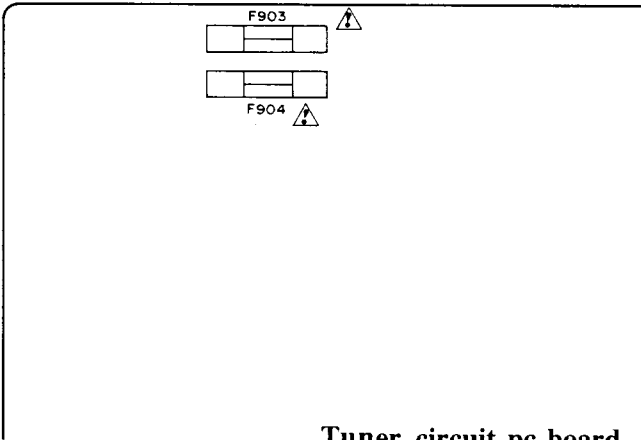
	Band step
U.S.A.	10kHz
Other region	9kHz

3. Memory preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.



Power supply circuit pc board



Tuner circuit pc board

4. Safety-check out

(Only U.S.A. model)

After correcting the original service problem perform the following safety check before releasing the set to the customer.

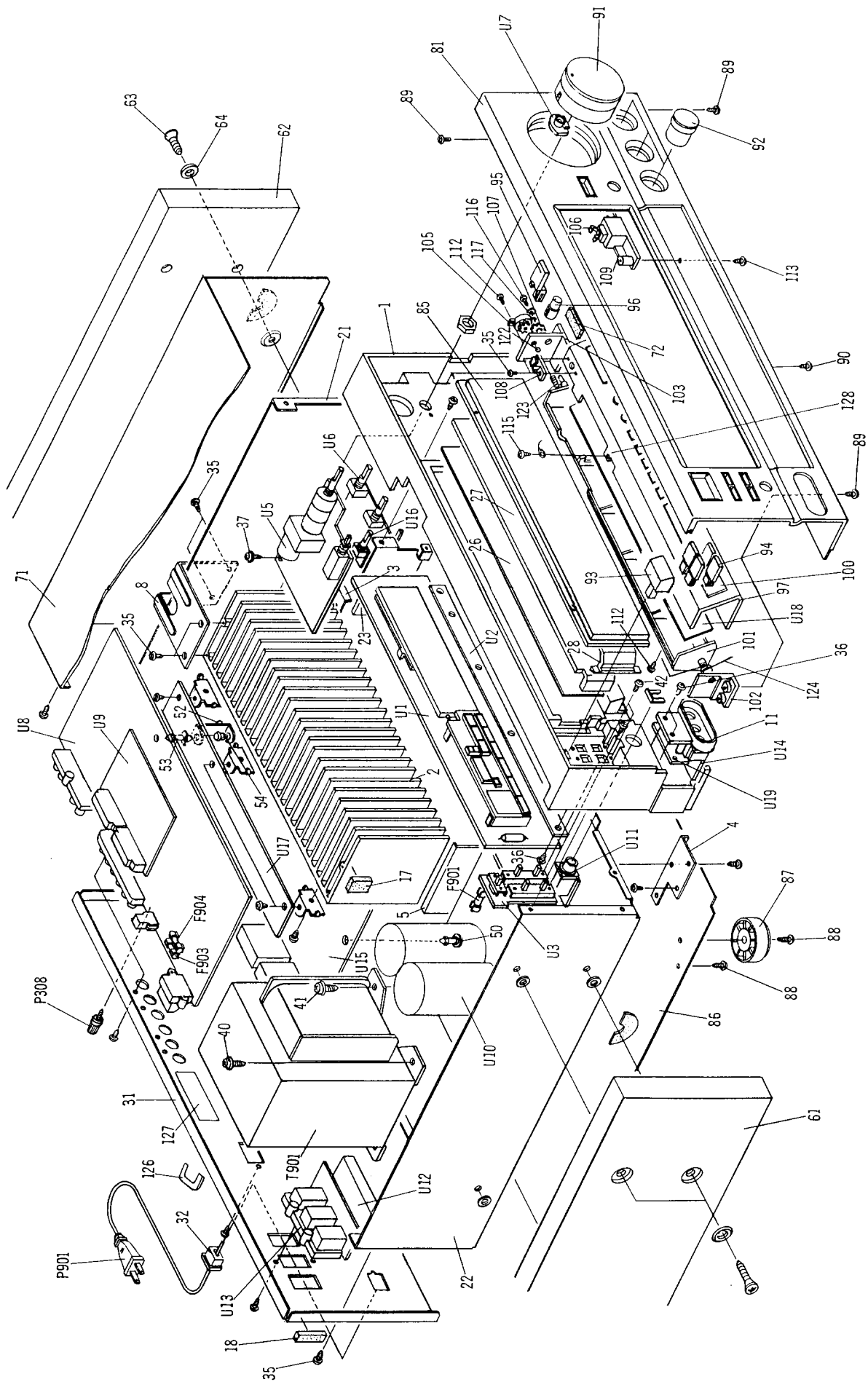
Connect the insulating-resistance tester between the plug of power supply cord and terminal GND on the back panel. Specifications: 3.3 Mohm ±10% at 500V.

5. Change of voltage

Worldwide models are equipped with a voltage selector to conform with local power supplies. This switch is located on the back panel. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the screw-driver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

EXPLODED VIEW



PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
1	27110531A	Front bracket ass'y
2	27160246	Radiator
3	27141301	Bracket H/R
4	27141302	Bracket H/L
5	27141359	Bracket H
8	27141322	Bracket R
10	27141360	Bracket B
11	27190736	Holder, Pin
17	28140927	2 x 30 x 10, Cushion
18	28140933	3 x 7 x 55, Cushion
21	27115240B	Side bracket R
22	27130564C	Bracket PT
23	27130591	Bracket F
26	28133234	Back plate
27	28130258	Dial plate
28	27190686	Holder, Dial plate
31	27121307-1	Back panel <D>
	27121307-3	Back panel <W>
	27121307-4	Back panel <Q>
32	27300750	△ Bushing(Strain-relief)
35	834430088	3TTS + 8B(BC), Self-tapping screw
36	833430080	3TTP + 8P(BC), Self-tapping screw
37	831130088	3TTW + 8B, Self-tapping screw
38	834430108	3TTS + 10B(BC), Self-tapping screw
39	834230108	3TTS + 10B(Ni), Self-tapping screw
40	830440089	4TTC + 8C(BC), Self-tapping screw
41	838440089	4TTB + 8C(BC), Self-tapping screw
42	82143006	3P + 6FN(BC), Pan head screw
43	834430128	3TTS + 12B(BC), Self-tapping screw
44	801433	Front main amp. transistor
	3SMS8W, SW + 14B(BC), Sems	self-tapping screw, Center/rear main amp. transistor
45	82142604	2.6P + 4F(BC), Pan head screw <W>
50	27190693	KGLS-6R, Holder
52	27141200A	Bracket PC
53	27190062	KGLS-12S, Holder
54	880009	NRP-345, Rivet
61	28185340A	Side panel L
62	28185342A	Side panel R
63	836440303	4STV + 30CQ(BC), Self-tapping screw
64	870086	W4 x 12(BC), Special washer
71	28184448	Top cover
72	28140835	0.5 x 10 x 135, Cushion
81	~~1A198134~~ 27190736	Front panel ass'y
85	28191537	Clear plate
86	27170254C	Bottom board
87	27175153-1	Leg
88	834430088	3TTS + 8B(BC), Self-tapping screw
89	833430080	3TTP + 8P(BC), Self-tapping screw
90	834430108	3TTS + 10B(BC), Self-tapping screw
91	28323558	Knob VOLUME
92	28323310	Knob TONE
93	28323241-A	Knob POWER
94	28323839A	Knob SPEAKER
95	28323646	Knob MIC
96	28323671	Knob VOLUME
97	27211148	Panel, lid

REF.NO.	PART NO.	DESCRIPTION
U1	1A198502-1	Knob ass'y, LID
	27190734	Holder DOOR
	27301265A	Bearing L
	27301266A	Bearing R
	28400363	Damper
	28400534	Holder, catch
U2	27301083	Gear, door
U3	27190735	Holder, lock
	27190737	Holder PU
	833420108	2TTP + 10B(BC), Self-tapping screw
	833430080	3TTP + 8P(BC), Self-tapping screw
U4	831430100	3TTW + 10P(BC), Self-tapping screw
	834430088	3TTS + 8B(BC), Self-tapping screw
U5	833420060	2.6TTP + 6P(BC), Self-tapping screw
	87642607	W2.6 x 71(BC), Flat washer
U6	270555	Steelball
	27180452	Spring
U7	27180453A	Spring
	27141033	Bracket, plug, Pre.,/Main
U8	29360626-1	△ Label, fuse rating <D>
	206112100	Clamp
	260215	Binder L (Right side of radiator)
	260208	Binder
U9	252053	△ 8A(ST-6), Fuse <D/W>
	252077	△ 4A-SE-EAK, Fuse <Q/W>
U10	252053	△ 8A(ST-6), Fuse <D>
	252079	△ 6.3A-SE-EAK, Fuse <Q/W>
	25060044	Terminal GND
	253123,	△ AS-UC6 #18, Power supply cord
	253136,	<D>
	253140 or	
	253146	
U11	253092-1A	△ AS-CEE-2, Power supply cord
	253118	<W>
U12	25050337	△ AS-SAA, Power supply cord <Q>
U13	25050346	△ NSCT-2P164, AC outlet <W>
	2201803,	△ NSCT-2P173, AC outlet <Q>
U14	2201804 or	△ 2SC3857-O,
	2201806	△ 2SC3857-Y or
U15	2201793,	amplifier
	2201794 or	△ 2SA1493-O,
U16	2201796	△ 2SA1493-Y or
	2201796	△ 2SA1493-P, Transistor, Front power amplifier
U17	2202063,	△ 2SC4511-O,
	2202064 or	△ 2SC4511-Y or
U18	2202066	△ 2SC4511-P, Transistor, Center/rear power amplifier
	2202053,	△ NSS-22113P, Voltage selector switch <W>
U19	2202056	△ 2SA1725-Y or
	2202056	△ 2SA1725-P, Transistor, Center/rear power amplifier
	25065287	△ NPT-1048DG, Power transformer
	2300489	<D>
	2300491	△ NPT-1048DG, Power transformer
	2300492	<W>
		<Q>

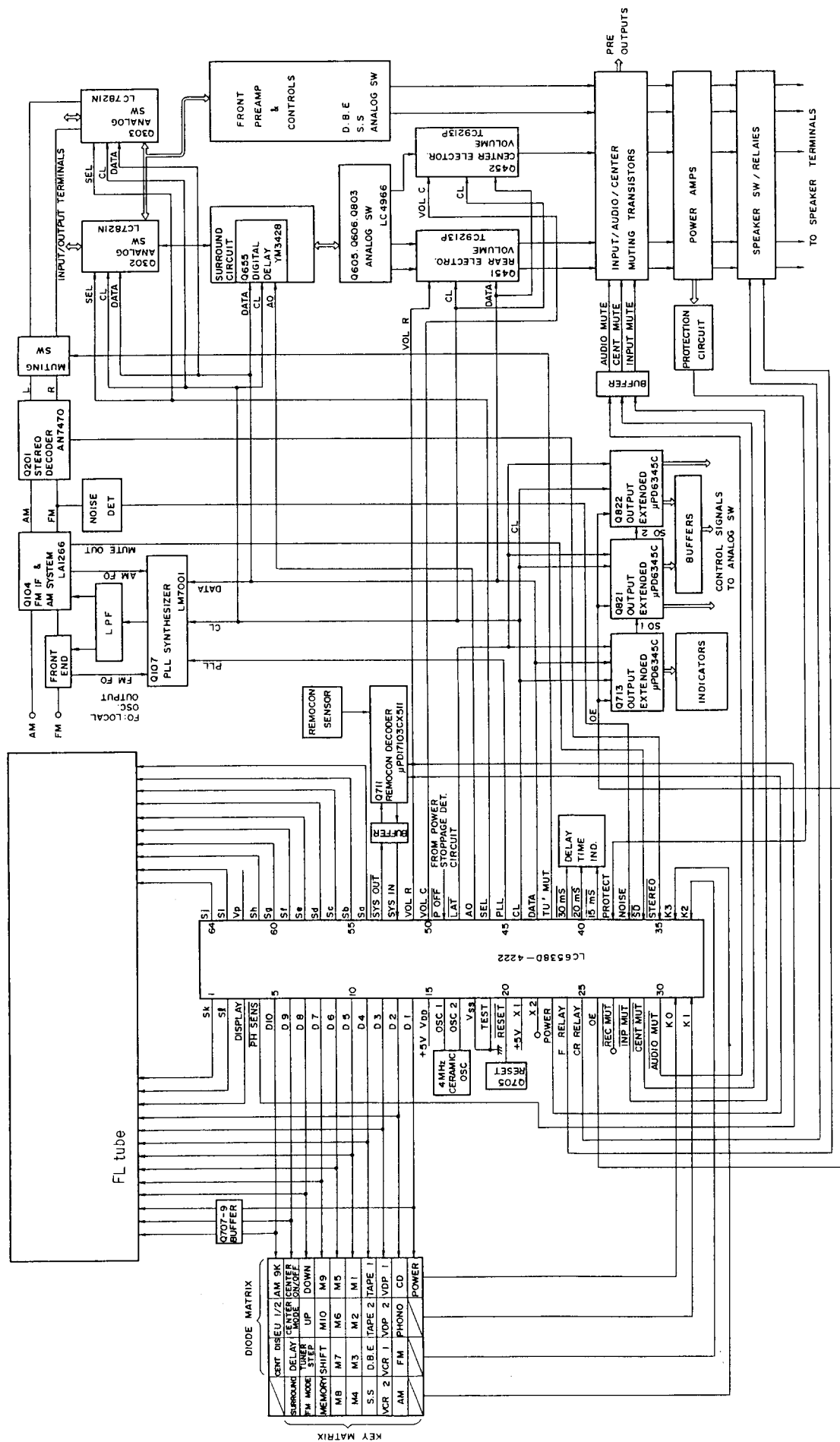
NOTE: <D>: Only 120V Model

<Q>: Only 240V Model

<W>: Only Worldwide Model

CAUTION: Replacement for transistor of mark△, if necessary, must be made from the same beta group (HFE) as the original type.

NOTE: THE COMPONENTS IDENTIFIED BY MARK △ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.



Terminal Descriptions

Pin No.	Function	Description
1	Sk	Segment output terminals. Active "H".
2	Sl	
3	DISPLAY	Display control output terminal. "H" during the display is lighted on.
4	PH SENS	Phono control output terminal. "L" when PHONO.
5 – 14	D10 – D1	Digit and key scan output terminals. Active "H".
15	V _{DD}	Power supply terminal. (+5V).
16	OSC1	Main system clock terminal. Connect to the 4.0MHz ceramic oscillator.
17	OSC2	
18	V _{SS}	Ground terminal.
19	TEST	Test terminal. Connect to V _{SS} .
20	RESET	Reset terminal. Active "L".
21	X1	Sub-clock terminal. Not used.
22	X2	
23	POWER	Power source control output terminal.
24	● FRELAY	Front speaker relay control output terminal.
25	● CRRELAY	Center and rear speaker relays control output terminal.
26	OE	Output enable output terminal. Active "H".
27	REC MUTE	Muting output terminal of recording output. Not used.
28	INP MUTE	Muting output terminal of input selector.
29	CENT MUTE	Muting output terminal of center (pre.) output.
30	AUDIO MUTE	Audio muting output terminal.
31 – 34	K0 – K3	Key matrix terminals.
35	STEREO	Stereo broadcast detection input terminal. Stereo at the low level.
36	SD	Station detection input terminal. Active "L".
37	NOISE	Noise detection input terminal. Active "L".
38	PROTECT	Protection circuit detection input terminal. This terminal becomes the low level when the protection circuit is operated. Control to the FRELAY and CRRELAY output terminals.
39	15ms	Dealy time indication output terminals.
40	20ms	
41	30ms	
42	TU MUT	Muting output terminal of tuner.
43	DATA	Data output terminal. Connect to the terminal DATA of PLL IC LM7001, terminal DI of analog switches LC7821N, terminal DIN of surround IC YM3428, terminal DATA of electro volume TC9213P, and terminal SIN of extended IC μ PD6345C.
44	CL	Clock output terminal. Connect to the terminal CL of PLL IC, terminal CL of analog switches, terminal SCI of surround IC, terminal CK of electro volume, and terminal SIN of extended IC.
45	PLL	Connect to the terminal CE of PLL IC.
46	SEL	Connect to the terminal CE of analog switches.
47	AO	Connect to the terminal AO of surround IC.
48	LAT	Connect to the terminal LAT of extended IC.
49	POFF	Stoppage detection input terminal. Active "L".
50	VOLC	Connect to the terminal STB of electro volume for the center volume.
51	VOLR	Connect to the terminal STB of electro volume for the rear volume.
52	SYS IN	System code input terminal.
53	SYS OUT	System code output terminal.
54 – 61	Sa-Sh	Segment output terminals.
62	VP	Power supply terminal for pull-down resistor.
63	Si	Segment output terminals.
64	Sj	

Key and Diode Matrix

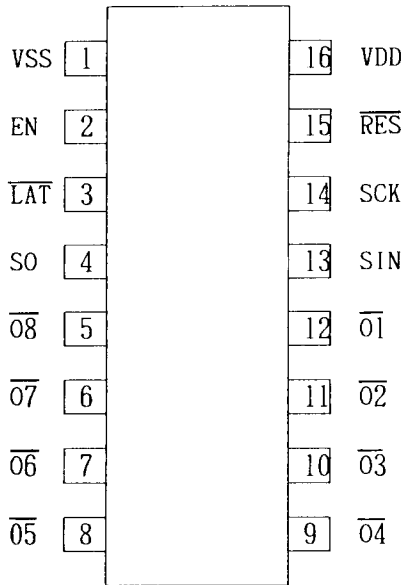
		#34	#33	#32	#31	
		K3	K2	K1	K0	
#14	D1				POWER	
#13	D2	AM	FM	PHONO	CD	
#12	D3	VCR2	VCR1	VDP2	VDP1	
#11	D4	SIMULATED	DBE	TAPE2	TAPE1	
#10	D5	M4	M3	M2	M1	
#9	D6	M8	M7	M6	M5	
#8	D7	MEMORY	SHIFT	M10	M9	
#7	D8	FM MODE	TUNING STEP	UP	DOWN	
#6	D9	SURROUND	DELAY	CENTER MODE	CNTER ON/OFF	
#5	D10		CENTER DIS	EU1/2	AM9K	Diode matrix

CENTER MODE Pressing this button changes the center mode cyclically from NORMAL to WIDE to PHANTOM.
DELAY TIME Pressing this button changes the delay time cyclically from 15 to 20 to 30m sec.
SURROUND MODE Pressing this button changes the surrround mode cyclically from BYPASS to DOLBY to HALL to MATRIX.

AM band wide setting

AM9K	EU1/2	Frequecny Range	Channel Space	Reference Frequency	IF Frequency
0		530 ~ 1710kHz	10kHz	10kHz	450kHz
1	0	522 ~ 1611kHz	9kHz	9kHz	450kHz
1	1	531 ~ 1602kHz	9kHz	9kHz	450kHz

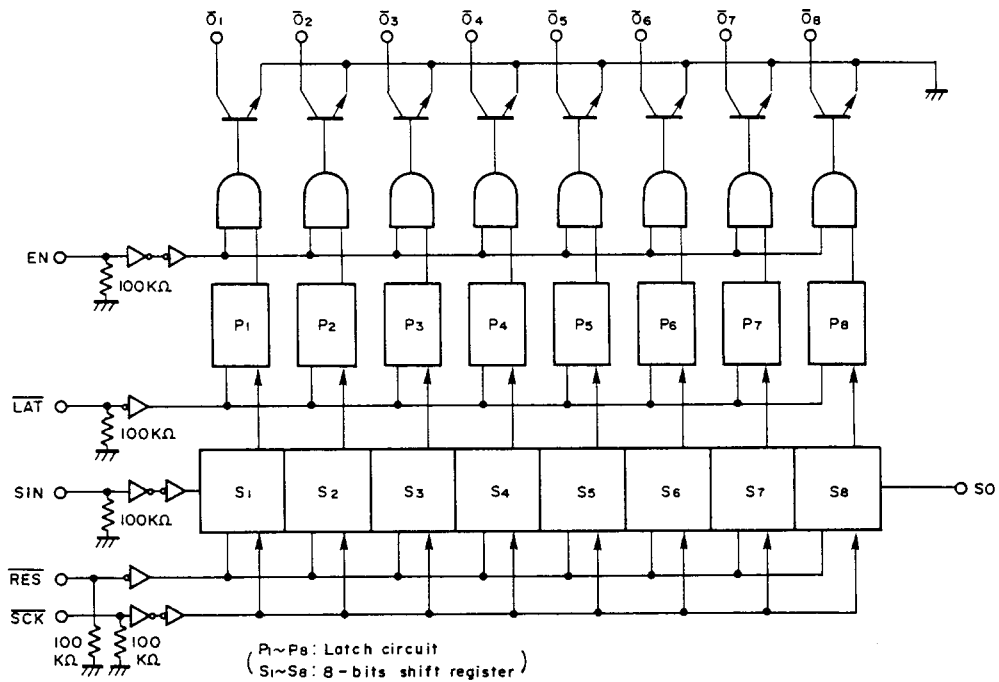
μPD6345C (Output Data Extended IC)



Pin No.	Symbol	Description
1	V _{SS}	Ground terminal.
2	EN	Chip enable terminal. Connect to the terminal CE of the Microprocessor LC6538D-4222.
3	LAT	Latch terminal. Connect to the terminal LAT of the microprocessor.
4	SO	Serial data output terminal.
5 – 12	08 – 01	Data output terminals.
13	SIN	Serial data input terminal.
14	SCK	Serial clock input terminal. Connect to the terminal CLOCk of microprocessor.
15	RESET	Reset input terminal. "L" when active.
16	V _{DD}	Power supply terminal. (+5V).

OUTPUT DATA DESCRIPTIONS

OUTPUT	Function	08	07	06	05	04	03	02	01
Q713	Indicator output	DOLBY	HALL	MATRIX	NORMAL	WIDE	PHANTOM	DBE	SIMULATED
Q821	Selector output	DOLBY	HALL	MATRIX		DBE	SIMULATED	VC2	VC1
Q822		DOLBY TEST	DOLBY TEST A	DOLBY TEST B	DOLBY TEST C	DOLBY TEST D	NORMAL	WIDE	CENTER



Video Selector Output (Q821 #11, #12)

Selector	VC2	VC1
VDP1	L	L
VDP2	H	L
VCR1	L	H
VCR2	H	H

Dolby Test Control Output

MODE	DOLBY TEST	DOLBY TEST A	DOLBY TEST B	DOLBY TEST C	DOLBY TEST D
L	L	H	L	H	H
C	L	L	L	H	L
R	L	H	H	H	L
S	L	L	L	L	H

Dolby test output terminals are the high level when except Dolby test mode.

ADJUSTMENT PROCEDURES

• Preparation

1. Input

FM mono: 1kHz, 75kHz devi., 60dB/ μ V

FM stereo: 1kHz, L+R 67.5kHz devi.,

Pilot signal 19kHz 7.5kHz devi.

AM: 400Hz 30% mod.

2. Outputs

Connect the non-inductive type resistors of 8ohms to the front speaker, center speaker, and rear speaker terminals unless otherwise noted.

3. Standard Knob Position

TAPE MONITOR SOURCE

VOLUME Maximum

BASS/TREBLE/BALANCE/INPUT

BALANCE Center

MUTING/LOUDNESS Off

VCR 2 STEREO

FRONT SPEAKER A

CENTER/REAR SPEAKERS ON

SURROUND MODE Bypass

SIMULATED STEREO Off

DYNAMIC BASS EXPANDER Off

Amplifier Section

1. Idling Current Adjustment (Front)

Connect the DC voltmeter to the terminals IID and VCT on the pre./main amplifier pc board. Adjust the semi-fixed resistors R533 and R534 so that the indication of voltmeter is $7.5 \pm 1.5\text{mV}$.

Note: Open load, Adjust after switching on for 5 minutes.

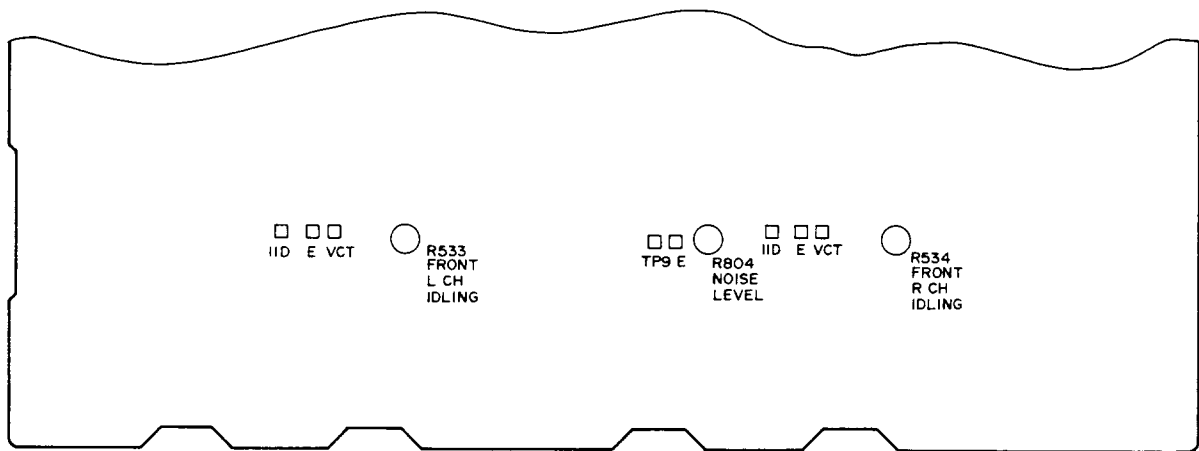
2. Idling Current Adjustment (Center)

Connect the DC voltmeter to the terminals IID and VCT on the rear and center amplifier pc board. Adjust the semi-fixed resistor R592 so that the indication of voltmeter is $7.5 \pm 1.5\text{mV}$.

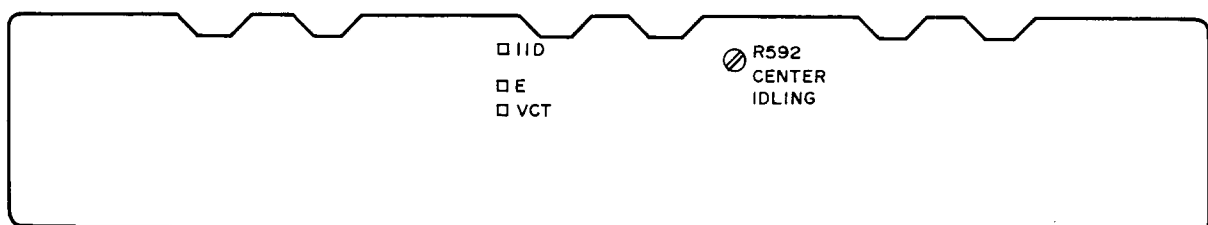
Note: Open load, Adjust after switching on for 5 minutes.

3. Dolby Noise Level Adjustment

Connect the AC voltmeter to the terminals TP9 and TPE. Press the button TEST of remote control transmitter. Adjust R804 so that the indication of voltmeter is 60mV. (30~120mV).



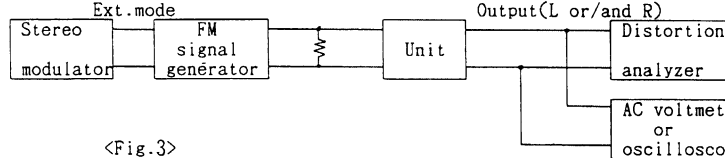
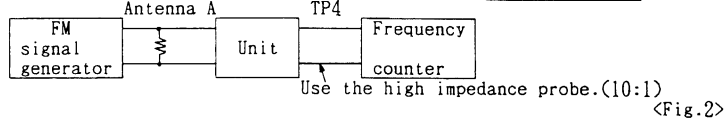
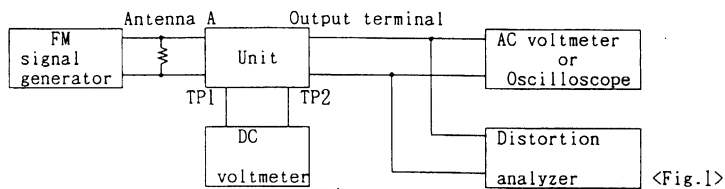
Pre./main amplifier pc board



Rear and center amplifier pc board

ection

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuning frequency	Output indicator	Adjustment point	Adjust for	Remarks
	1	Fig. 1	99.1MHz 1kHz, 75kHz devi. 65dBf (60dB)		99.1MHz	DC voltmeter	L101	0±20mV	FM MUTE/TUNING STEP switch: OFF/FINE Repeat the steps 1 and 2 until no further adjustment is necessary.
	2					AC voltmeter	IFT on the front end	Maximum	
	3					Distortion analyzer	L102	Minimum	
		Fig. 2	99.1MHz 1kHz, 75kHz devi. 65dBf (60dB)		99.1MHz	Frequency counter	R201	19kHz±10Hz	MODE switch: STEREO
ortion		Fig. 3	99.1MHz, Ext mod., 65dBf (60dB)	Channel L or R 1kHz	99.1MHz	Distortion analyzer	IFT on the front end	Mjimum	Don't turn more than ±180°
ation	1	Fig. 3	99.1MHz Ext. modulation 65dBf (60dB)	Channel L 1kHz	99.1MHz	Channel R AC voltmeter	R202	Minimum	Maximum and same separation.
	2			Channel R 1kHz		Channel L AC voltmeter		Minimum	
g		Fig. 3	99.1MHz 17.2dBf (12dB)		99.1MHz	TUNING indicator	R101	Light on	FM MUTE/TUNING STEP switch: ON



ection

AM SG output	Tuning frequency	Output indicator	Adjustment point	Adjust for
	530kHz (522kHz) (531kHz)	Digital DC voltmeter	OSC coil on RF block	1.5±0.1V
600kHz (603kHz) 400Hz, 30% mod. 60dB/m	600kHz (603kHz)	AC voltmeter	ANT coil on RF block	Maximum
990kHz 400Hz, 30% mod. 60dB/m	990kHz	AC voltmeter	L152	Maximum

{ } : Australian model () : 9kHz step model

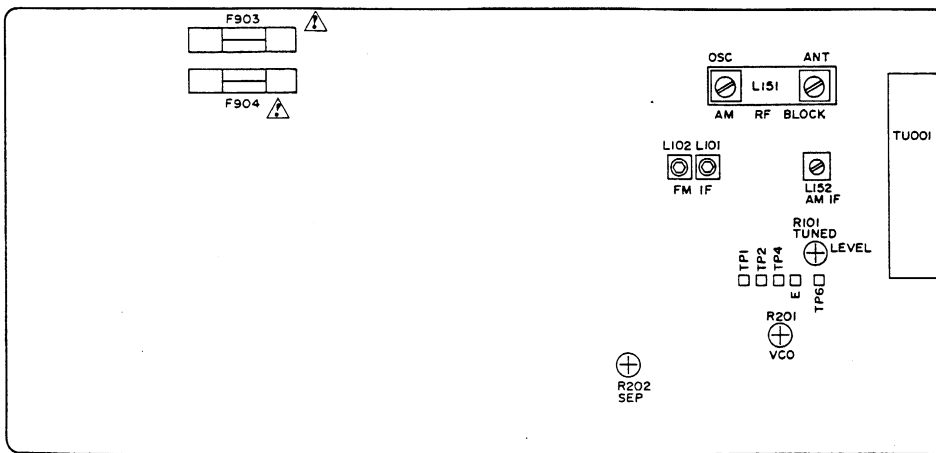
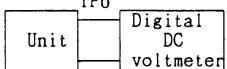
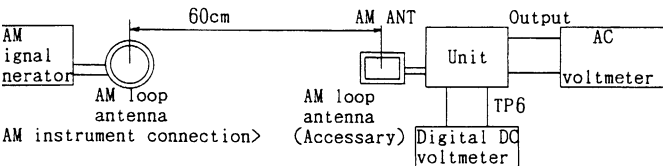
Reference Specifications

FM tuned voltage: 87.5MHz – 108.00MHz
2.0±0.4V – 7.7±0.4V

AM tuned voltage: 530kHz 1.5±0.5V
1710kHz 7.2±0.5V (10kHz step model)
522kHz 1.5±0.5V
1611kHz 7.2±0.5V (9kHz step model)

Auto stop level: AM: Less than 62dB/m
FM: Less than 17dBμ

Confirmation of tuned voltage



Tuner circuit pc bo

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

PRINTED CIRCUIT BOARD PARTS LIST

TUNER CIRCUIT PC BOARD(NARF-3709-1/1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
Front End		
TU001	240084	TFFG2U122A
ICs		
Q104	22240039	LA1266
Q107	22240090	LM7001
Q201	22240242	AN7470
Q251	22240284	LA7951
Q902	222780125NEC	78M12HF
Q903, Q904	222780055NEC	78M05HF
Q906	222780125NEC	78M12HF
Q907	222790125	79M12HF
Transistors		
Q101	2211723	2SC1923-O
Q102	2210746	2SC945A-P
Q103, Q106	2211183 or	2SC1740-R or
Q131	2211255	2SC1815-GR
Q105	2212294	2SK108-D, FET
Q108, Q109	2213090	DTA114YS
Q202	2213090	DTA114YS
Q203, Q204	2212794	2SD1468-R
Q252, Q253	2211183 or	2SC1740-R or
	2211255	2SC1815-GR
Q254	221282	DTC144E-S <D>
Q901	2211455	2SA1015-GR
Q909-Q912	2213640	DTC123JS
Diodes		
D101, D102	223132	1K60, Germanium

CIRCUIT NO.	PART NO.	DESCRIPTION
D103	223163	1SS133
D131, D132	223163	1SS133
D133	224450512	MTZ5.1B, Zener
D201, D202	223163	1SS133
D902-D908	22380032	1SR139-100
D909	224452704	MTZ27D, Zener
D910	223163	1SS133
D911, D913	22380032	1SR139-100
D912	224450472	MTZ4.7B, Zener
D914	223163	1SS133
D915	22380022	RBV402
D916-D923	223163	1SS133
Transformers		
L101	233401	NFIF-4072
L102	233402	NFIF-4073
L152	232139	NMIF-4062
Coils		
L103	233400K033	NCH-2228
L131	231081	NCH-2129
L151	232148	NMRF-7050
L201, L202	233294	NMC-5040
L581-L583	231001	S-1.3B
Ceramic Filters		
X101, X102	3010137	SFE10.7MMK
X103	3010006	SFE10.7MA8
X151	3010123	SFZ450JL
X152	3010076	BFU450C
Crystal osc		
X104	3010141	XTL-7.2M

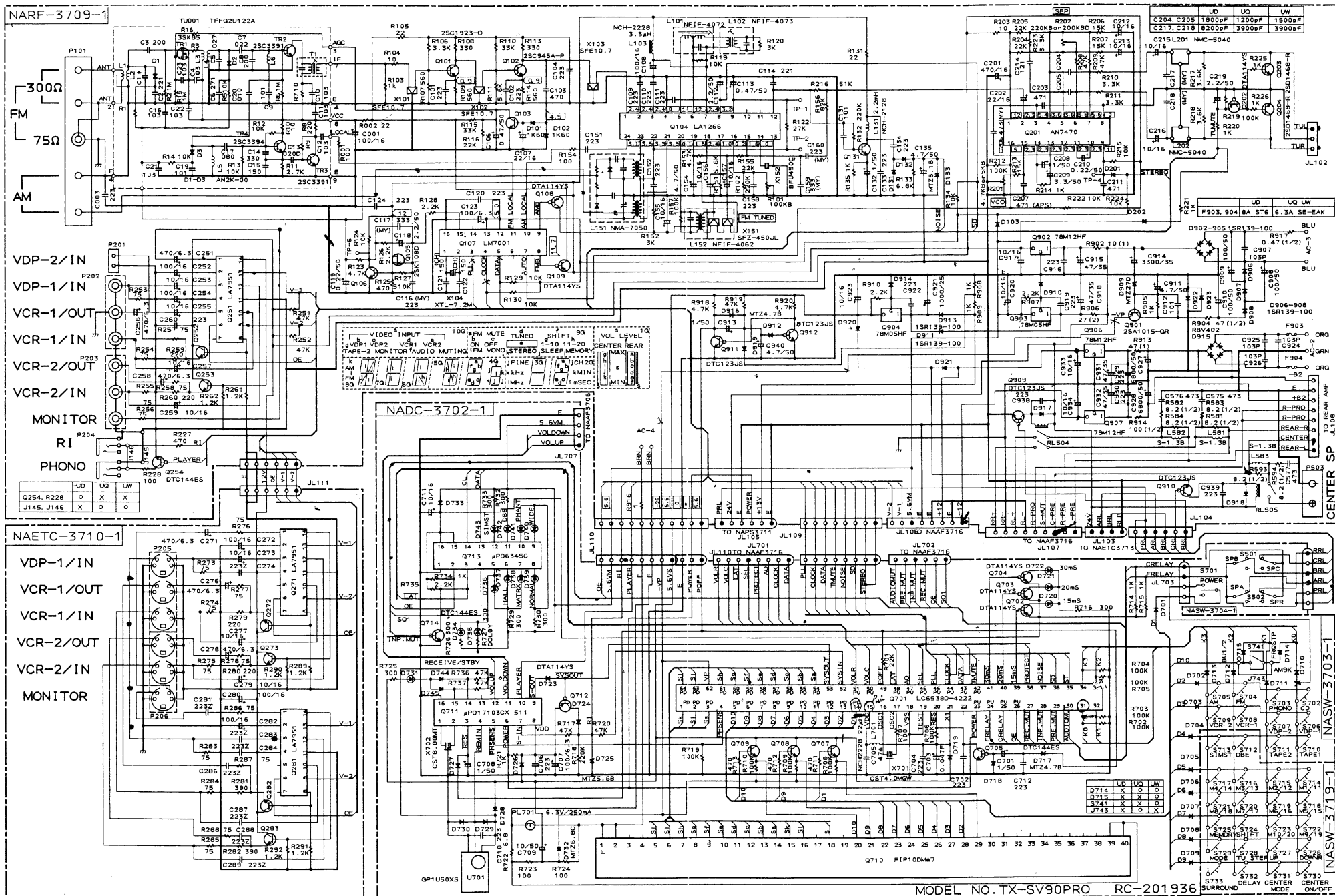
TUNER CIRCUIT PC BOARD

CIRCUIT NO.	PART NO.	DESCRIPTION
Capacitors		
C001	354741019	100 μ F, 16V, Elect.
C106	354784799	0.47 μ F, 50V, Elect.
C107	354742209	22 μ F, 16V, Elect.
C108	354741019	100 μ F, 16V, Elect.
C112	354780229	2.2 μ F, 50V, Elect.
C113	354784799	0.47 μ F, 50V, Elect.
C116	371122234	0.022 μ F, 5%, 50V, Mylar
C117	371123334	0.033 μ F, 5%, 50V, Mylar
C118	354780229	2.2 μ F, 50V, Elect.
C119	354782299	0.22 μ F, 50V, Elect.
C123	354741019	100 μ F, 16V, Elect.
C132	354780109	1 μ F, 50V, Elect.
C135, C154	354780479	4.7 μ F, 50V, Elect.
C155-C157	354741009	10 μ F, 16V, Elect.
C159	371123334	0.033 μ F, 5%, 50V, Mylar
C160	371122234	0.022 μ F, 5%, 50V, Mylar
C201	354744719	470 μ F, 16V, Elect.
C202	354742209	22 μ F, 16V, Elect.
C204, C205	371121824	1800pF, 5%, 50V, Mylar <D>
	371121224	1200pF, 5%, 50V, Mylar <Q/W>
C206	371124734	0.047 μ F, 5%, 50V, Mylar
C207	370134714	470pF, 5%, 100V, APS
C208	354780109	1 μ F, 50V, Elect.
C209	354780339	3.3 μ F, 50V, Elect.
C210	354782299	0.22 μ F, 50V, Elect.
C212, C213	354741009	10 μ F, 16V, Elect.
C215, C216	354741009	10 μ F, 16V, Elect.
C217, C218	371128224	8200pF, 5%, 50V, Mylar <D>
	371123924	3900pF, 5%, 50V, Mylar <Q/W>
C219	354780229	2.2 μ F, 50V, Elect.
Resistors		
R101	5210221 or 5210070	N06HR100KBD, Semi
R201	5210216 or 5210062	N06HR5KBD or N06HR4.7KBD, Semi
R202	5210072 or 5210222	N06HR220KBD or N06HR200KBD, Semi
R581-R584	442520824	8.2ohm, 1/2W, Metal o
R593, R594	442520824	8.2ohm, 1/2W, Metal o
R902	441621004	10ohm, 1W, Metal oxi
R904	442524704	47ohm, 1/2W, Metal o
R906	441722704	27ohm, 2W, Metal oxi
R913	441624704	47ohm, 1W, Metal oxi
R914	442521014	100ohm, 1/2W, Metal
R917	442520104	1ohm, 1/2 W, Metal o
Relaies		
RL504	25065339	NRL-2P5ADC-24V-0
RL505	25065379	NRL-1P5A-DC-24V-
Terminals		
P101	25060145	NTM-5PDMN073, A
P503	25060143	NTM-2PDMLO71, Ce
Sockets		
JL102	25050267	NSCT-3P95
JL104, JL105	25050270	NSCT-6P98
JL106, JL108	25050272	NSCT-8P100
JL109		
JL107	25050273	NSCT-9P101
JL110	25050275	NSCT-11P103
Plug		
P201	25055132	NPLG-2P116
Jacks		
P202, P203	25045205	NPJ-3PDYE085, VID
		IN/OUT
P204	25045172	HSJ1003-01-020, RI
Radiators		
Q902a	27160209	RAD67
Q906a	27160211	RAD68
Fuses		
F903, F904	252053	Δ 8A(ST-6) <D>
	252079	Δ 6.3A-SE-EAK <Q/W>
Label		
	29360622	T6.3A/250A <Q/W>
Holders		
F903a, F904a	250113	Δ SN5051, Fuse <D>
	25050065	Δ YSH403T, Fuse<Q/W>

NOTE: <D>: Only 120V Model
 <Q>: Only 240V Model
 <W>: Only Worldwide Model

SCHEMATIC DIAGRAM

TUNER SECTION



MODEL NO. TX-SV90PRO RC-201936

ONKYO CORPORATION

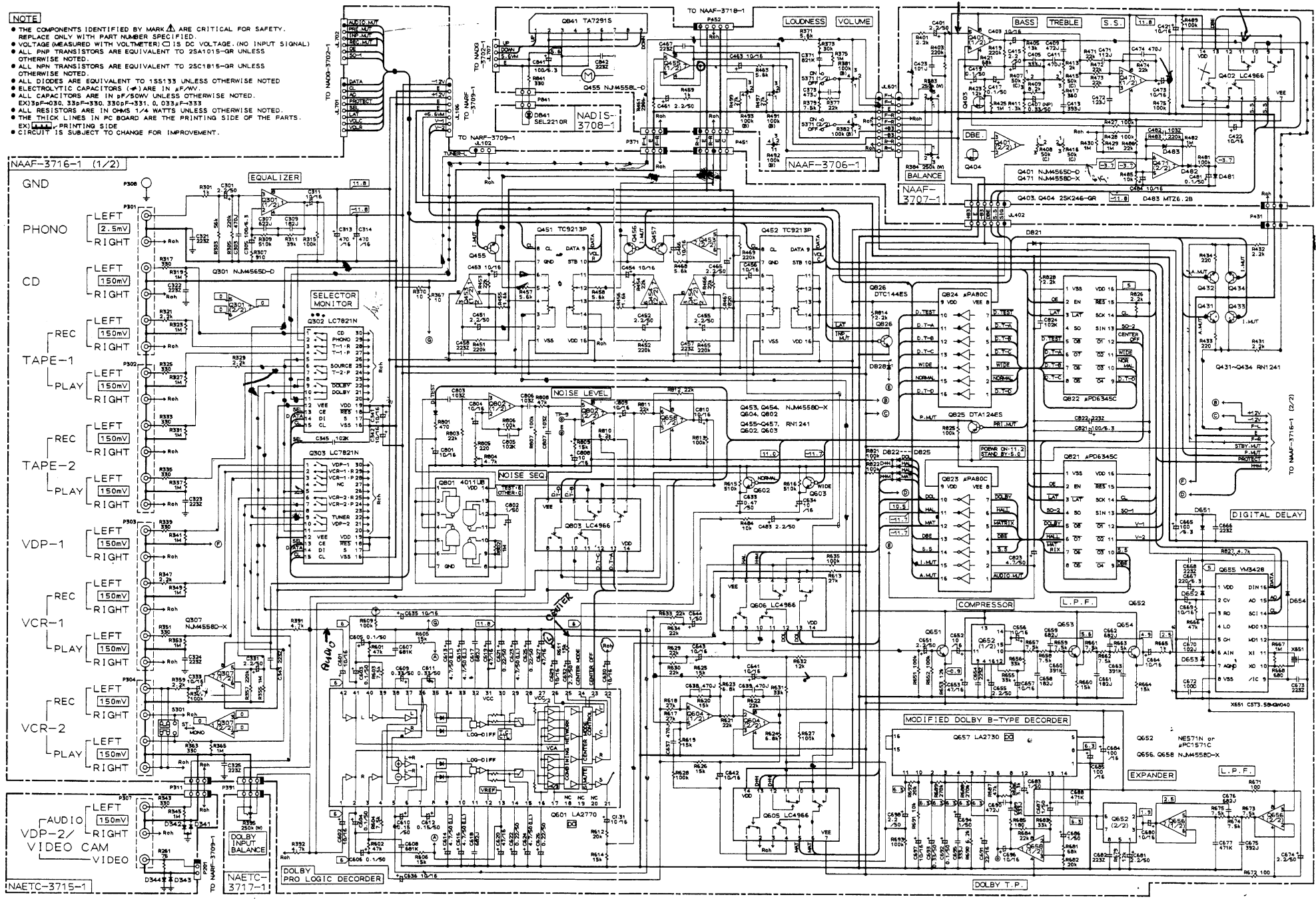
CHEMATIC DIAGRAM

TX-SV90PRO

A B C D E F G

- PRE./CONTROL AMPLIFIER SECTION -

- [NOTE]**
- THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
 - VOLTAGE (MEASURED WITH VOLTMETER) $\square$ IS DC VOLTAGE (NO INPUT SIGNAL).
 - ALL PNP TRANSISTORS ARE EQUIVALENT TO 2SC1815-GR UNLESS OTHERWISE NOTED.
 - ALL NPN TRANSISTORS ARE EQUIVALENT TO 2SC1815-GR UNLESS OTHERWISE NOTED.
 - ALL DIODES ARE EQUIVALENT TO 1SS133 UNLESS OTHERWISE NOTED.
 - ELECTROLYTIC CAPACITORS (Φ) ARE IN μ F/VV.
 - ALL CAPACITORS ARE IN pF/50V UNLESS OTHERWISE NOTED.
 - EX33p=0.33, 33p=330, 330p=331, 0.033p=333.
 - ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED.
 - THE THICK LINES IN PC BOARD ARE THE PRINTING SIDE OF THE PARTS.
 - EX (EXP.) - PRINTING SIDE.
 - CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.



PRINTED CIRCUIT BOARD PARTS LIST

PRE., /MAIN AMPLIFIER PC BOARD(NAAF-3716-1)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
ICs					
Q301	22240191	NJM4565D-D	Q825	2212600	DTA124ES
Q302, Q303	22240280	LC7821N	Q826	221282	DTC144ES
Q307	222502	NJM4558D-X	Q851-Q854	2213631 or 2213632	RN1241-A or RN1241-B
Q451, Q452	22240266	TC9213P	Diodes		
Q453, Q454	222502	NJM4558D-X	D501-D508	223163	1SS133
Q601	22240279	LA2770	D551	224450512	MTZ5.1B, Zener
Q604	222502	NJM4558D-X	D552, D553	223163	1SS133
Q605, Q606	22240025	LC4966	D651-D654	223163	1SS133
Q652	22240115 or 22240131	NE571N or μ PC1571C	D801	223163	1SS133
Q655	22240281	YM3428	D821-D825	223163	1SS133
Q656, Q658	222502	NJM4558D-X	D826	223150,	US1040,
Q657	22240139	LA2730		223145 or	1S2076TD or
Q801	222840112TOS	4011UB		223124	1S2473
Q802, Q861	222502	NJM4558D-X	D827, D828	223163	1SS133
Q803	22240025	LC4966	Coils		
Q821, Q822	22240211	μ PD6345C	L501, L502	231134	S-0.8E
Q823, Q824	222801	μ PA80C	Ceramic osc		
Transistors			X651	3010155	CST3.58MGW040
Q431-Q434	2213631 or 2213632	RN1241-A or RN1241-B	Capacitors		
Q456-Q458	2213631 or 2213632	RN1241-A or RN1241-B	C301, C302	354780229	2.2 μ F, 50V, Elect.
Q501, Q502	2211371 or 2211372	2SC2259-O-001 or 2SC2259-O-002	C305, C306	354721019	100 μ F, 6.3V, Elect.
Q503-Q506	2213074 or 2211455	2SA933-R or 2SA1015-GR	C307, C308	371126224	6200pF, 5%, 50V, Mylar
Q507-Q510	2211732 or 2211733	2SC1845-F or 2SC1845-E	C309, C310	371121824	1800pF, 5%, 50V, Mylar
Q511, Q512	2211353 or 2211354	2SA949-O or 2SA949-Y	C311, C312	354741009	10 μ F, 16V, Elect.
Q513, Q514	2211633 or 2211634	2SC2229-O or 2SC2229-Y	C313, C314	354744719	470 μ F, 16V, Elect.
Q515, Q516	2211183 or 2211255	2SC1740-R or 2SC1815-GR	C331, C332	354780229	2.2 μ F, 50V, Elect.
Q517, Q518	2202034 or 2202035	2SD1763A-D or 2SD1763A-E	C333, C334	354741009	10 μ F, 16V, Elect.
Q519, Q520	2202024 or 2202025	2SB1186A-D or 2SB1186A-E	C341, C342	354741009	10 μ F, 16V, Elect.
Q521, Q522	2201803, 2201804 or 2201806	☆2SC3857-O, ☆2SC3857-Y or ☆2SC3857-P	C451, C452	354780229	2.2 μ F, 50V, Elect.
Q523, Q524	2201793, 2201794 or 2201796	☆2SA1493-O, ☆2SA1493-Y or ☆2SA1493-P	C453, C454	354741009	10 μ F, 16V, Elect.
			C455	354780229	2.2 μ F, 50V, Elect.
			C456, C466	354741009	10 μ F, 16V, Elect.
			C465, C483	354780229	2.2 μ F, 50V, Elect.
			C503, C504	391741009	10 μ F, 16V, Elect. <HWQ>
			C507, C508	354742219	220 μ F, 16V, Elect.
			C513, C514	354780229	2.2 μ F, 50V, Elect.
			C525, C526	371124734	0.047 μ F, 5%, 50V, Mylar
			C531, C532	354700109	1 μ F, 160V, Elect.
			C533, C534	335251039	0.01 μ F, 500V, Ceramic
			C553	354722219	220 μ F, 6.3V, Elect.
			C555	354700109	1 μ F, 160V, Elect.
			C601, C602	354741009	10 μ F, 16V, Elect.
			C603-C606	354781099	0.1 μ F, 50V, Elect.
			C609, C611	354783399	0.33 μ F, 50V, Elect.
			C610, C612	354781599	0.15 μ F, 50V, Elect.
			C613-C616	392850477	4.7 μ F, 25V, Elect.(LL)
			C617, C618	371126824	6800pF, 5%, 50V, Mylar
			C619, C620	354744709	47 μ F, 16V, Elect.
			C621, C622	354782299	0.22 μ F, 50V, Elect.
			C623, C624	392850477	4.7 μ F, 25V, Elect.(LL)
			C625, C626	354782299	0.22 μ F, 50V, Elect.
			C627	354744709	47 μ F, 16V, Elect.
			C629-C631	354741009	10 μ F, 16V, Elect.
			C632	354780229	2.2 μ F, 50V, Elect.
			C633	354784799	0.47 μ F, 50V, Elect.
			C634-C636	354741009	10 μ F, 16V, Elect.
			C641-C643	354741009	10 μ F, 16V, Elect.
			C644	354780109	1 μ F, 50V, Elect.
			C651	354780229	2.2 μ F, 50V, Elect.
			C652	354741009	10 μ F, 16V, Elect.
			C653	354744709	47 μ F, 16V, Elect.
			C655	354780229	2.2 μ F, 50V, Elect.

CAUTION: Replacement for transistor of mark ☆, if necessary, must be made from the same beta group (HFE) as the original type.

2SC3857-O 2SA1493-O

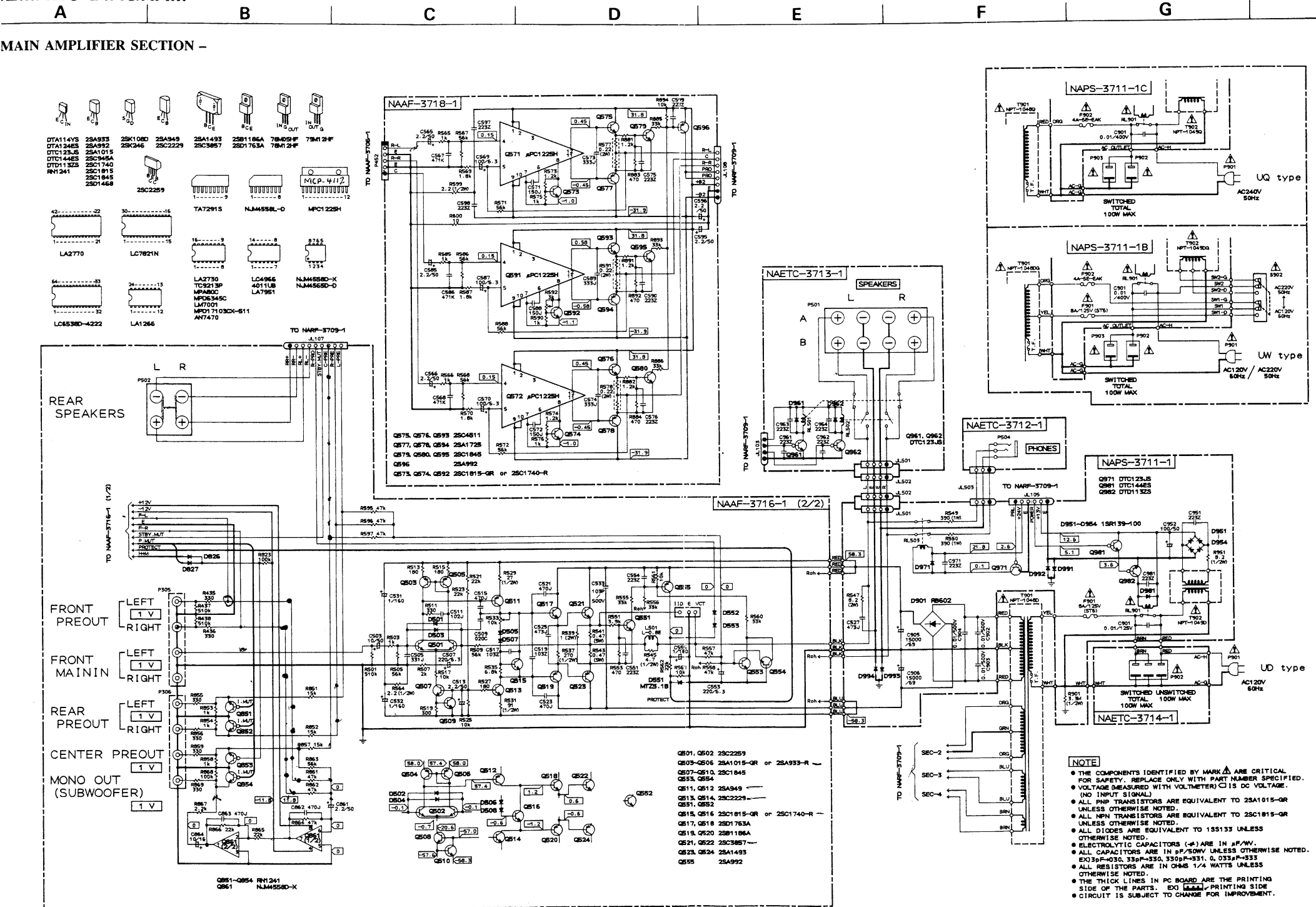
Same beta group

Q551, Q552	2211633 or 2211634	2SC2229-O or 2SC2229-Y
Q553, Q554	2211732 or 2211733	2SC1845-F or 2SC1845-E
Q555	2211792 or 2211793	2SA992-F or 2SA992-E
Q602, Q603	2213631 or 2213632	RN1241-A or RN1241-B
Q651, Q653	2211183 or	2SC1740-R or
Q654	2211255	2SC1815-GR

CIRCUIT NO.	PART NO.	DESCRIPTION
C656, C657	354741009	10 μ F, 16V, Elect.
C658, C661	371121824	1800pF, 5%, 50V, Mylar
C659, C662	371126824	6800pF, 5%, 50V, Mylar
C664	354741009	10 μ F, 16V, Elect.
C665	354721019	100 μ F, 6.3V, Elect.
C667	354722219	220 μ F, 6.3V, Elect.
C669, C680	354741009	10 μ F, 16V, Elect.
C670	373301024	1000pF, 5%, 125V, Plastic (PP)
C674, C681	354780229	2.2 μ F, 50V, Elect.
C675	371123924	3900pF, 5%, 50V, Mylar
C676	371126824	6800pF, 5%, 50V, Mylar
C683	354780109	1 μ F, 50V, Elect.
C684, C685	354741019	100 μ F, 16V, Elect.
C686, C687	354780109	1 μ F, 50V, Elect.
C689	371123334	0.033 μ F, 5%, 50V, Mylar
C690	371124724	4700pF, 5%, 50V, Mylar
C691	354742209	22 μ F, 16V, Elect.
C692	354781099	0.1 μ F, 50V, Elect.
C693	354783399	0.33 μ F, 50V, Elect.
C694	354780109	1 μ F, 50V, Elect.
C695	371123334	0.033 μ F, 5%, 50V, Mylar
C696, C697	354741009	10 μ F, 16V, Elect.
C698	354780229	2.2 μ F, 50V, Elect.
C801, C804	354741009	10 μ F, 16V, Elect.
C802	354780109	1 μ F, 50V, Elect.
C808-C810	354741009	10 μ F, 16V, Elect.
C821	354721019	100 μ F, 6.3V, Elect.
C823	354780479	4.7 μ F, 50V, Elect.
C861	354780229	2.2 μ F, 50V, Elect.
C864	354741009	10 μ F, 16V, Elect.
Resistors		
R529, R530	442522704	27ohm, 1/2W, Metal oxide film
R531, R532	442529104	91ohm, 1/2W, Metal oxide film
R533, R534	5210119 or 5210064	N06HR10KBC or N06HR10KBD, Semi-fixed
R537, R538	442522714	270ohm, 1/2W, Metal oxide film
R539, R540	441720104	1ohm, 2W, Metal oxide film
R541-R544	4500022 or 4000080	BPR58FK 0.47 or MPC74-5WK 0.47, Metal plate
R545, R546	441520474	4.7ohm, 1/2W, Metal oxide film
R564	442520224	2.2ohm, 1/2W, Metal oxide film
R804	5210118 or 5210062	N06HR5KBC or N06HR4.7KBD, Semi-fixed
Switch		
S301	25065286	NSS-22112, Slide, VCR-2 MODE
Terminals		
P301	25045252	NPJ-6PDBL-124
P302, P303	25045213	NPJ-6PDBL-92
P304-P306	25045171	NPJ-4PDBL-65
P502	25060144	NTM-4PDML072
Plugs		
P311, P431a	25055133	NPLG-3P117
P451a	25055135	NPLG-5P119
Sockets		
P371	2000931	NSAS-6P884
P391	2009990022	NSAS-6P0046
JL402, JL702	25050270	NSCT-6P98
JL701	25050272	NSCT-8P100
Clamps		
	27301186	MSA-1606

SCHEMATIC DIAGRAM

MAIN AMPLIFIER SECTION -



PRINTED CIRCUIT BOARD PARTS LIST

VIDEO TERMINAL PC BOARD(NAETC-3710-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q271, Q281	22240284	LA7951
Transistors		
Q272, Q273	2211183 or	2SC1740-R or
Q282, Q283	2211255	2SC1815-GR
Capacitors		
C271, C276	354724719	470 μ F, 6.3V, Elect.
C272	354741019	100 μ F, 16V, Elect.
C273, C277	354741009	10 μ F, 16V, Elect.
C278	354724719	470 μ F, 6.3V, Elect.
C280, C282	354741019	100 μ F, 16V, Elect.
C279	354741009	10 μ F, 16V, Elect.
Sockets		
P205	25050395	NSCT-12P222
P206	25050394	NSCT-12P221

POWER SUPPLY CIRCUIT PC BOARD(NAPS-3711-1/1B/1C)

CIRCUIT NO.	PART NO.	DESCRIPTION
Transistors		
Q971	2213640	DTC123JS
Q981	221282	DTC144ES
Q982	2213650	DTD113ZS
Diodes		
D901	223898	RB602
D951-D954	22380032	1SR139-100
D971, D981	223163	1SS133
D991-D994	223163	1SS133
Power transformer		
T902	2300493	NPT-1049D <D>
	2300495	NPT-1049DG <W>
	2300496	NPT-1049Q <Q>
Capacitors		
C527, C528	371124734	0.047 μ F, 5%, 50V, Mylar
C901	3500065A	DE7150FZ103PAC400V/125V, IS
C902-C904	335251039	0.01 μ F, 500V, Ceramic
C905, C906	3504222	15, 000 μ F, 69V, Elect.
C952	354781019	100 μ F, 50V, Elect.
Resistors		
R547, R548	441720824	8.2ohm, 2W, Metal oxide film
R549, R550	441623914	390ohm, 1W, Metal oxide film
R901	431523355	3.3Mohm, 1/2W, Solid <D>
R951	442520824	8.2ohm, 1/2W, Metal oxide film
Relaies		
RL503	25065342	NRL-2P1.25A-DC24-048
RL901	25065248	NRL-1P15A-DC12-29
Socket		
P904	2009990020	NSAS-6P0044 <D>
Fuses		
F901	252053	8A(ST-6) <D/W>
F902	252077	4A-SE-EAK <Q/W>
Fuseholders		
F901a	250113	SN5051 <D/W>
F902a	25050065	YSH403T <Q/W>

HEADPHONE TERMINAL PC BOARD(NAETC-3712-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
P504	25045256	YKB26-5010, Headphone terminal

SPEAKER RELAY PC BOARD (NAETC-3713-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
Transistors		
Q961, Q962	2213640	DTC123JS
Diodes		
D961, D962	223163	1SS133
Relaies		
RL501, RL502	25065339	NRL-2P5A-DC24-046

CIRCUIT NO.	PART NO.	DESCRIPTION
Terminal		
P501	25060125	NTM-8PDMN058, Front Speaker

AC OUTLET TERMINAL PC BOARD(NAETC-3714-1) (Only 120V Model)

CIRCUIT NO.	PART NO.	DESCRIPTION
P902	25050388	NSCT-6P215, AC outlet

VDP CIRCUIT PC BOARD(NAETC-3715-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
D341-D344	223163	1SS133, Diodes
P307	25045266	NPJ-3PDBL133, VDP terminal
P201	2009990021A	NSAS-4P0045, Socket
P311	2000785	NSAS-6P741, Socket

INPUT BALANCE VOLUME PC BOARD(NAETC-3717-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
R395	5104258	N11RGLC250KWT15Z, Variable resistor

SPEAKER/POWER SWITCH PC BOARD(NASW-3704-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
S501, S502	25035617	NPS-222-L579, Push switches
S701	25035618	NPS-122-S580, Power switch

BAND STEP SWITCH PC BOARD(NASW-3705-1) (Only Worldwide Model)

CIRCUIT NO.	PART NO.	DESCRIPTION
S741	25065267	NSS-22109, Slide switch

MASTER VOLUME PC BOARD(NAAF-3706-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q455	22240293	NJM4558L-D
Q841	22240239	TA7291S
Capacitors		
C373, C374	371124734	0.047 μ F, 5%, 50V, Mylar
C461, C462	354780229	2.2 μ F, 50V, Elect.
C463, C464	354741009	10 μ F, 16V, Elect.
C841	354721019	100 μ F, 6.3V, Elect.
Resistor		
R381, R382	5140001	N16RGL100KBT30F, Variable, Master Volume
R491-R493		
Switch		
S371	25035428	NPS-122-L392, LOUDNESS
Plugs		
P371a	25055133	NPLG-3P117
P452a	25055135	NPLG-5P119
Sockets		
P451	2009990023	NSAS-10P0047
P841	2000635A	NSAS-4P591

VOLUME INDICATOR PC BOARD(NADIS-3708-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
D841	225241 or	SEL2210R-C or
	225242	SEL2210R-D, L.E.D
	27190545	Holder, LED

NOTE: THE COMPONENTS IDENTIFIED BY MARK ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBERS SPECIFIED.

NOTE: <D>: Only 120V Model
<Q>:Only 240V Model
<W>:Only Worldwide Model

PRINTED CIRCUIT BOARD PARTS LIST

DIGITAL CIRCUIT PC BOARD(NADG-3702-1/1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
Remocon sensor		
U701	24130003	GP1U50XS
ICs		
Q701	22240282	LC6538D-4222
Q711	22240283	μPD17103CX-511
Q713	22240211	μPD6345C
FL tube		
Q710	212079	FIP10DMW7
Transistors		
Q702-Q704	2213090	DTA114YS
Q705	221282	DTC144ES
Q707-Q709	2211183 or 2211255	2SC1740-R or 2SC1815-GR
Q712	2213090	DTA114YS
Q714	221282	DTC144ES
Lamp		
PL701	210064B	PL6.3V250mA
Diodes		
D701-D713	223163	1SS133
D714	223163	1SS133 <Q>
D714, D715	223163	1SS133 <W>
D717	224450472	MTZ4.7B, Zener
D718, D719	223163	1SS133
D723, D724	223163	1SS133
D725	224450562	MTZ5.6B, Zener
D726-D730	223163	1SS133
D732	224450683	MTZ6.8C, Zener
D733	223163	1SS133
D744, D745	223163	1SS133
L.E.Ds		
D720-D722	225137CG,	SEL2413E-CG,
D736-D743	225137DG or 225137DY	SEL2413E-DG or SEL2413E-DY
D731	225141	SEL2213C
D734, D735	225141	SEL2213C
Ceramic oscs		
X701	3010150	CST4.00MGW
X702	3010154	CST8.00MT
Coil		
L701	233400K220	NCH-2228
Capacitors		
C701	353780109	1 μF, 50V, Elect.
C703	3000051 or 3020027	0.047F, 5.5V Super
C705	375524744	0.47μF, 5%, 50V, Plastic(MMT)
C707	353721019	100 μF, 6.3V, Elect.
C708	353780109	1 μF, 50V, Elect.
C709	353781009	10μF, 50V, Elect.
C711	353741009	10μF, 16V, Elect.
Plug		
P701a	25055375	NPLG-11P358
Holder		
	27190732	L.E.D
Spacer		
	27270302	

SOURCE SELECTOR SWITCH PC BOARD(NASW-3703-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
S702-S711	25035548	NPS-111-S510, Push switches

TONE CONTROL CIRCUIT PC BOARD(NAAF-3707-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q401	22240191	NJM4565D-D
Q402	22240025	LC4966
Q471	222502	NJM4558D-X
Transistors		
Q403, Q404	2211945	2SK246-GR, F.E.T.
Diodes		
D481, D482	223163	1SS133
D483	224450623	MTZ6.2C, Zener

CIRCUIT NO.	PART NO.	DESCRIPTION
Capacitors		
C401, C402	391780229	2.2 μF, 50V, Elect.(HWQ)
C403, C404	391741009	10μF, 16V, Elect.(11WQ)
C405, C406	371123334	0.033 μF, 5%, 50V, Mylar
C407, C408	352983396	0.33μF, 50V, Non-polar elect.
C409, C410	371124724	4700pF, 5%, 50V, Mylar
C413, C414	371123934	0.039 μF, 5%, 50V, Mylar
C415, C416	354780229	2.2 μF, 50V, Elect.
C417-C420	354781099	0.1 μF, 50V, Elect.
C421, C422	354741009	10μF, 16V, Elect.
C471	371121124	1100pF, 5%, 50V, Mylar
C472	371121234	0.012 μF, 5%, 50V, Mylar
C473	354741009	10μF, 16V, Elect.
C481	354781099	0.1 μF, 50V, Elect.
C484	354741009	10μF, 16V, Elect.
Resistors		
R383, R384	5104215	N14RLC250KW22Z, Variable, BALANCE
R407, R408	5104216	N14RLC50KC22Z, Variable, BASS
R415, R416	5104216	N14RLC50KC22Z, Variable, TREBLE
Socket		
P431	2000783	NSAS-6P739

REAR AND CENTER AMPLIFIER PC BOARD(NAAF-3718-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q571, Q572 Q591	22240108	μPC1225H
Transistors		
Q573, Q574	2211183 or	2SC1740-R or
Q592	2211255	2SC1815-GR
Q575, Q576	2202063,	☆2SC4511-O,
Q593	2202064 or	☆2SC4511-Y or
	2202066	☆2SC4511-P
Q577, Q578	2202053,	☆2SA1725-O,
Q594	2202054 or	☆2SA1725-Y or
	2202056	☆2SA1725-P

CAUTION: Replacement for transistor of mark ☆, if necessary must be made from the same beta group (HFE) as the original type.

	Ex. 2SC4511-O	2SA1725-O
	Same beta group	
Q579, Q580	2211732 or	2SC1845-F or
Q595	2211733	2SC1845-E
Q596	2211792 or	2SA992-F or
	2211793	2SA992-E

Capacitors		
C565, C566	354780229	2.2 μF, 50V, Elect.
C569, C570	354721019	100 μF, 6.3V, Elect.
C573, C574	371123334	0.033 μF, 5%, 50V, Mylar
C585	354780229	2.2 μF, 50V, Elect.
C587	354721019	100 μF, 6.3V, Elect.
C589	371123334	0.033 μF, 5%, 50V, Mylar
C595, C596	354780229	2.2 μF, 50V, Elect.

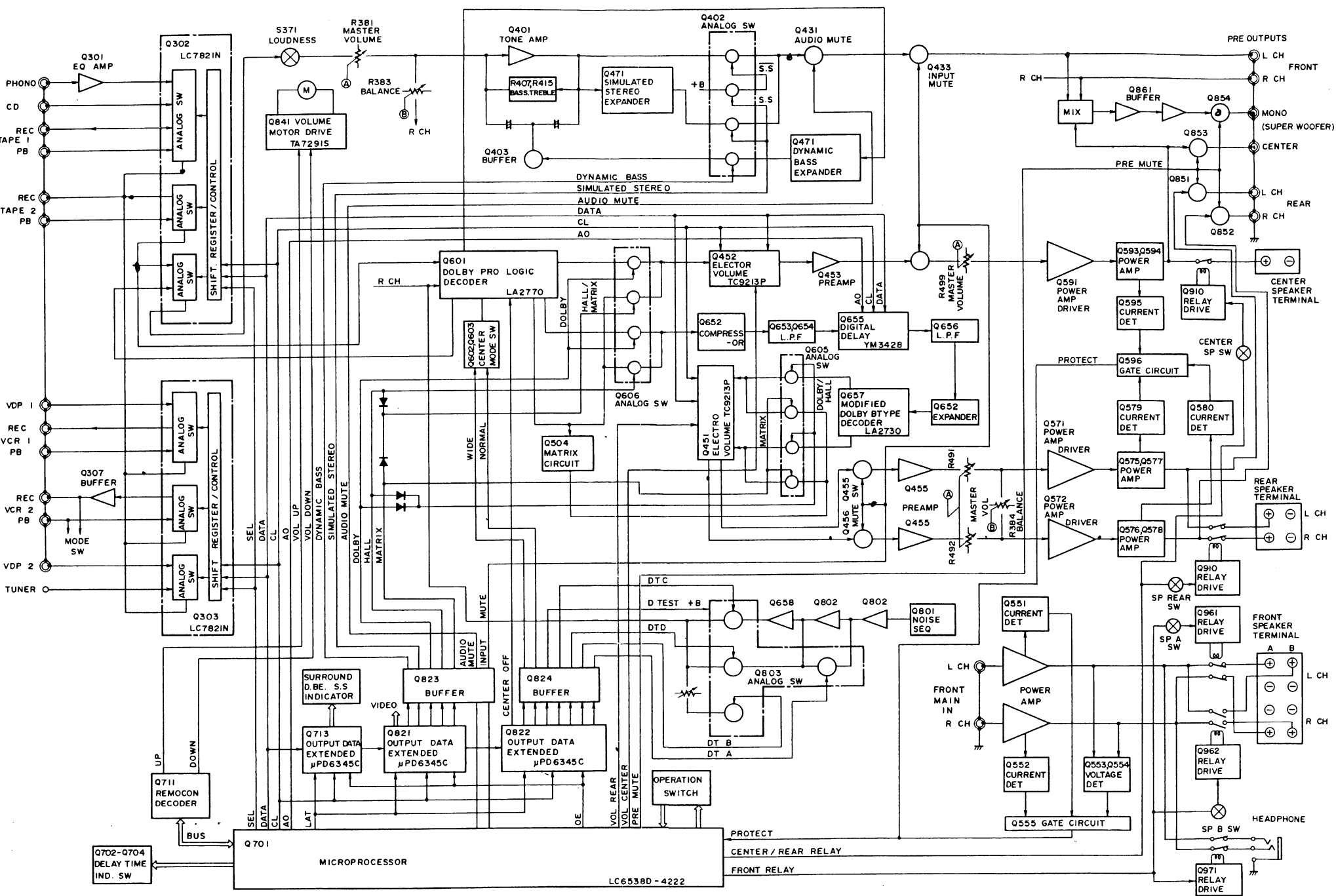
Resistors		
R577, R578	4500027	0.22ohm, 2W, Metal plate
R591		
R592	5215061	N08HR3KBC, Semi-fixed
R599	442520224	2.2ohm, 1/2W, Metal oxide film

Socket		
<u>P452</u>	<u>2009990024</u>	<u>NSAS-10P0048</u>

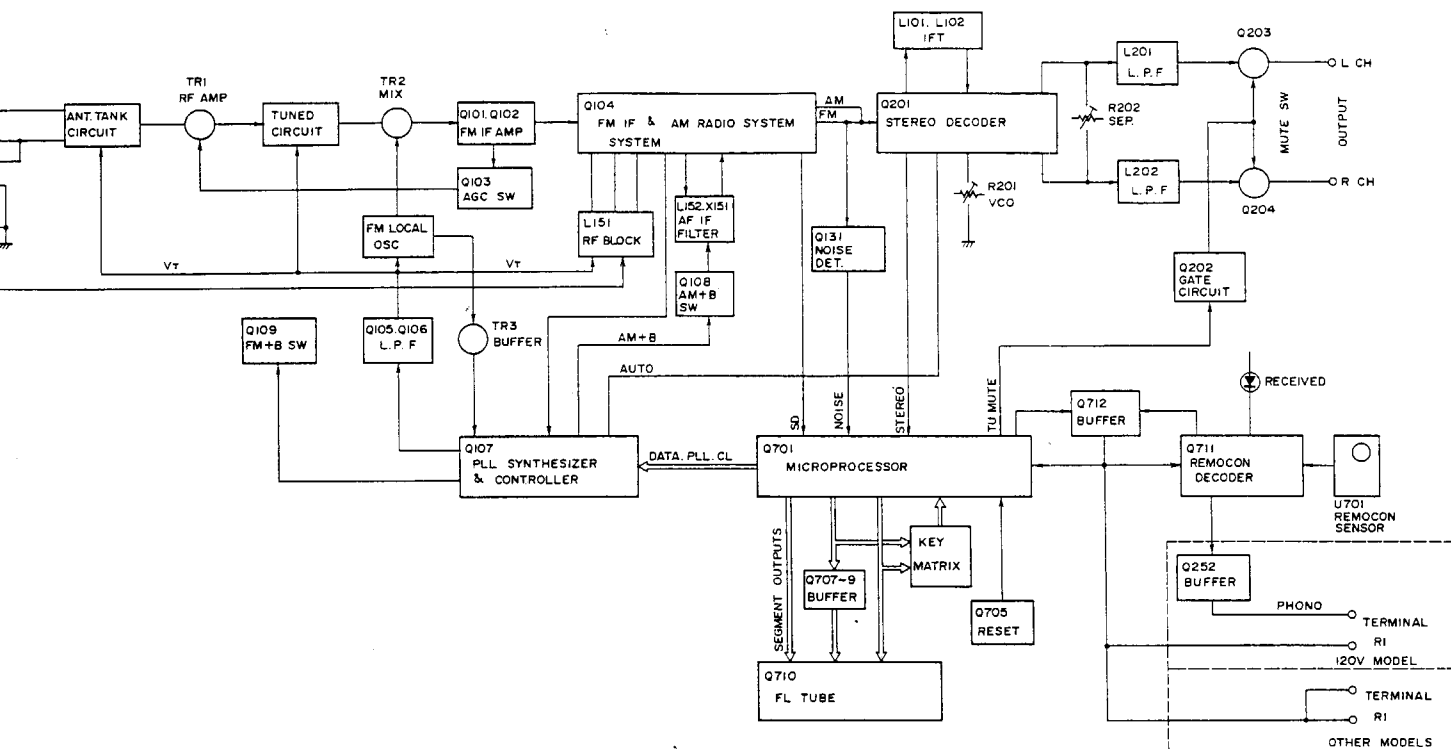
STATION SWITCH PC BOARD(NASW-3719-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
S712-S733	25035548	NPS-111-S510, Push switches
P701b	2006312223	NSAS-22P0050, Socket

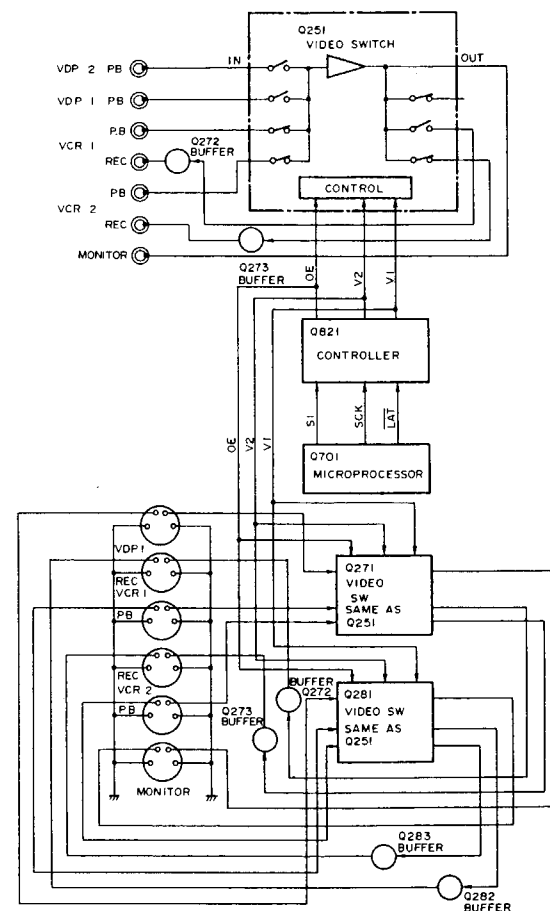
NOTE: <G>: Only 240V Model
<W>: Only Worldwide Model



INNER SECTION -



- VIDEO SECTION -

**WR SUPPLY SECTION -**